REMARKS

REJECTIONS UNDER 35 U.S.C. § 112, FIRST PARAGRAPH

The Examiner has rejected claims 1-20 under 35 U.S.C. § 112, first paragraph, because the Examiner believes that the specification does not reasonably provide enablement for methods where the employed blowing agent and low-boiling inert gas are the same material. Specifically, the Examiner believes that the materials "blowing agent" and "low-boiling inert gas" may be the same component, and Applicants' supporting disclosure is not enabling for both components to be the same material.

In response to this rejection, the independent claims have been amended to specify that the blowing agent and low-boiling inert gas are in fact distinct compounds.

REJECTIONS UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

The Examiner has rejected claims 1-7, 10-13, 16-18, and 20 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as their invention. In particular, the Examiner believes that the term "low-boiling" is a relative term that renders the claim indefinite.

In view of the amendments that have been made to the independent claims, as well as the claims dependent thereon, the Examiner's rejection in this respect has been rendered moot.

The Examiner has also rejected claims 10-15 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as their invention. The Examine opines that when appended to an otherwise definite expression, the term "type" extends the scope of the expression so as to render it objectionably indefinite. The Examiner has required appropriate correction.

Despite the Examiner's requirement, reconsideration is respectfully requested. That is, claim 10 has been drafted in a format, namely Jepson format, that is believed to be appropriate. In this respect, Applicants do not believe that the term "type" extends the scope of the expression so as to render the claims indefinite.

REJECTIONS UNDER 35 U.S.C. § 103

The Examiner has rejected claims 1-20 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,882,052 to Raynor et al. in view of U.S. Patent No. 5,278,195 to Volkert et al. According to the Examiner, Raynor discloses preparations of isocyanate-based rigid foams prepared by contacting streams of isocyanate component and polyol component wherein the contacting takes place in the presence of blowing agent in nitrogen gas to enhance the foaming action, and wherein the materials are applied to surface that meets the criteria of "laminator" as defined by the claims. The Examiner cites the entire document in support. Also, the Examiner relies on column 6, lines 65 *et seq.* to maintain that Raynor teaches control over the flow rates of its reactants. The Examiner acknowledges that Raynor differs from the claimed invention with respect to formation of polyurethane foams. In order to compensate for this shortcoming, the Examiner relies on Volkert, which allegedly discloses that control of the relative amounts of reactive materials dictates formation of isocyanurate foam products rather than polyurethane products. Also, the Examiner believes that Volkert provides motivation for achieving increased flame retardancy as a reason to desire a modulation in reactant amounts. Accordingly, the Examiner believes that it would have been obvious to have modified the NCO indices in a manner taught by Volkert within practice of Raynor for the purpose of increasing flame retardancy.

In view of the amendments made to the claims, reconsideration is respectfully requested. Notably, the recitation "where the amount of nitrogen present at the time said contacting is greater than 1.25 times the amount of the Bunsen coefficient for nitrogen within the stream of reactants that comprise an isocyanate-reactive compound" has been added. Support for this amendment can be found at page 10 of the written description. Here, the Applicants explain that the amount of air that is dissolved in any given liquid under standard conditions is termed the Bunsen Coefficient. This coefficient is known and understood by those skilled in the art.[1] Regardless of the empirical coefficient for a given composition, it should be readily understood that 100% of that number is the amount of gas (*e.g.,* air) dissolved in the composition at equilibrium at standard conditions. An amount in excess of this value

[1] See Appendix A.

would be greater than 100%. For example, 125% or 1.25 times the value of the coefficient refers to a composition that includes 25% more gas than would otherwise exist at equilibrium under standard conditions. Therefore, those skilled in the art readily understand what is meant by "greater than 1.25 times the amount of the Bunsen Coefficient.

Those skilled in the art will also readily understand that in order to increase the amount of gas (*e.g.,* nitrogen) beyond the Bunsen Coefficient, external forces such as pressure can be employed. In other words, when a composition is placed under pressure, additional gas can be dissolved into the composition. When the composition is returned to standard conditions, the additional gas dissolved in the composition will escape thereby allowing the composition to return to 100% of its Bunsen Coefficient.

As the Applicants have explained in the written description, frothing, which the Applicants have found to be desirable, can be achieved by increasing the amount of nitrogen within the composition beyond 100% of the Bunsen Coefficient (*e.g.,* 1.25 times), which can be achieved with pressure, and releasing this pressurized composition to standard conditions. In other words, the polyisocyanurate composition employed in practicing the invention is under pressure within the mix head, and therefore the amount of nitrogen dissolved within the composition can be increased beyond the Bunsen Coefficient. Upon exiting the mix head, the composition returns to standard conditions, and the nitrogen in excess of that required to achieve the Bunsen Coefficient escapes from the composition and thereby causes frothing. This is distinguishable from foaming that often occurs as the result of certain blowing agents being converted from the liquid to the gaseous phase as a result of heat that is generated from the urethane/cyanurate reaction.

With this understanding, the fact that Raynor does not teach, suggest, or motivate one skilled in the art to practice the claimed invention should be appreciated. To begin with, Raynor is concerned with forming a non-froth composition. Therefore, although Raynor teaches the addition of nitrogen gas in the amount of 0.003% to about 0.08% by weight[2], one would not be inclined to add an amount of nitrogen beyond the Bunsen Coefficient to achieve frothing because the same would defeat the purpose of Raynor's teachings.

[2] Column 4, lines 15-32.

Furthermore, those skilled in the art further understand that many raw materials, particularly those employed in the formation of polyurethane/polyisocyanurate, and even more particularly polyol, are manufactured and delivered with levels of dissolved nitrogen or air that is often below the Bunsen Coefficient. If the raw material is exposed to standard environmental conditions for sufficient periods of time, the amount of dissolved nitrogen or air within the raw material will reach equilibrium; *i.e.,* it will reach the Bunsen Coefficient. If the raw material (*e.g.,* polyol) is employed in the manufacture of polyisocyanurate prior to this time, the amount of nitrogen or air dissolved therein could very well be below the Bunsen Coefficient. As a result, even the addition of additional nitrogen or air to the raw material may not bring the level of nitrogen to the Bunsen Coefficient, and certainly may not bring the level of nitrogen or air to 1.25 times the Bunsen Coefficient. In this respect, the mere fact that Raynor teaches the addition of nitrogen for the purpose of nucleation does not teach or suggest adding sufficient air or nitrogen to reaction at least 1.25 times the Bunsen Coefficient.

The Examiner has rejected claims 1-20 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,264,464 to Wishneski et al. in view of U.S. Patent No. 5,278,195 to Volkert et al. According to the Examiner, Wishneski discloses preparations of isocyanate-based rigid foams prepared by contacting streams of isocyanate component and polyol component wherein the contacting takes place in the presence of blowing agent in nitrogen gas to enhance the foaming action, and wherein the materials are applied to surface that meets the criteria of "laminator" as defined by the claims. The Examiner cites the entire document in support. Also, the Examiner relies on column 9, lines 32-34 to maintain that Wishneski teaches control over the flow rates of its reactants. The Examiner acknowledges that Wishneski differs from the claimed invention with respect to formation of polyurethane foams. In order to compensate for this shortcoming, the Examiner relies on Volkert, which allegedly discloses that control of the relative amounts of reactive materials dictates formation of isocyanurate foam products rather than polyurethane products. Also, the Examiner believes that Volkert provides motivation for achieving increased flame retardancy as a reason to desire a modulation in reactant amounts. Accordingly, the Examiner believes that it would have been obvious to have modified the NCO indices in a manner taught

by Volkert within practice of Wishneski for the purpose of increasing flame retardancy.

Reconsideration is respectfully requested in view of the amendments that have been made to the independent claims. Wishneski does not teach or suggest the use of an amount of nitrogen or air at an amount 1.25 times the amount of the Bunsen Coefficient. Instead, Wishneski is concerned with replacing the blowing agent FREON 12 with fluorocarbon R-22 (*i.e.,* monochlorodifluoromethane). Columns 8, 9, and 10 suggest that in the manufacture of foams, the ingredients (*e.g.,* the isocyanate ingredient and the polyol ingredient) can be transported from their supply sources by use of nitrogen pressure. The use of nitrogen to assist in the delivery of urethane ingredients does not suggest adding to the ingredients an amount of nitrogen sufficient to achieve 1.25 times the Bunsen Coefficient. This is especially true in view of the fact that the raw materials employed in the urethane reaction could very well include an amount of nitrogen well below the Bunsen Coefficient. Thus, even if nitrogen were dissolved into the ingredients from the use of nitrogen in assisting the delivery of the ingredients, this amount of nitrogen could very well not even achieve the Bunsen Coefficient, let alone 1.25 times the Bunsen Coefficient. Accordingly, Wishneski's simple use of nitrogen for purposes of delivering ingredients does not teach or suggest the claimed invention. And, Volkert does not supply any teaching or suggestion to overcome this shortcoming. Accordingly, there can be no *prima facie* case of obviousness.

CONCLUSION

In view of the foregoing amendments and arguments presented herein, the Applicants believe that they have properly set forth the invention and accordingly, respectfully requests the Examiner to the rejections provided in the last Office Action. A formal Notice of Allowance of claims 1-4, 6-7, 10-12, 16-18, and 21-26 is earnestly solicited. Should the Examiner care to discuss any of the foregoing in greater detail, the undersigned attorney would welcome a telephone call.

Although Applicants have has added new claims 21-26, the cancellation of claims 5, 8-9, 13-15 and 19-20 has offset any additional fees that would have been associated with the addition of these claims. Nonetheless, in the event that a fee required for the filing of this document is missing or insufficient, the undersigned attorney hereby authorizes the Commissioner to charge payment of any fees associated

with this communication or to credit any overpayment to Deposit Account No. 06-0925.

Respectfully submitted,

Arthur M. Reginelli, Reg. No. 40,139
Renner, Kenner, Greive, Bobak, Taylor & Weber
Fourth Floor, First National Tower
Akron, Ohio 44308-1456
Telephone: (330) 376-1242

Attorney for Applicants

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